

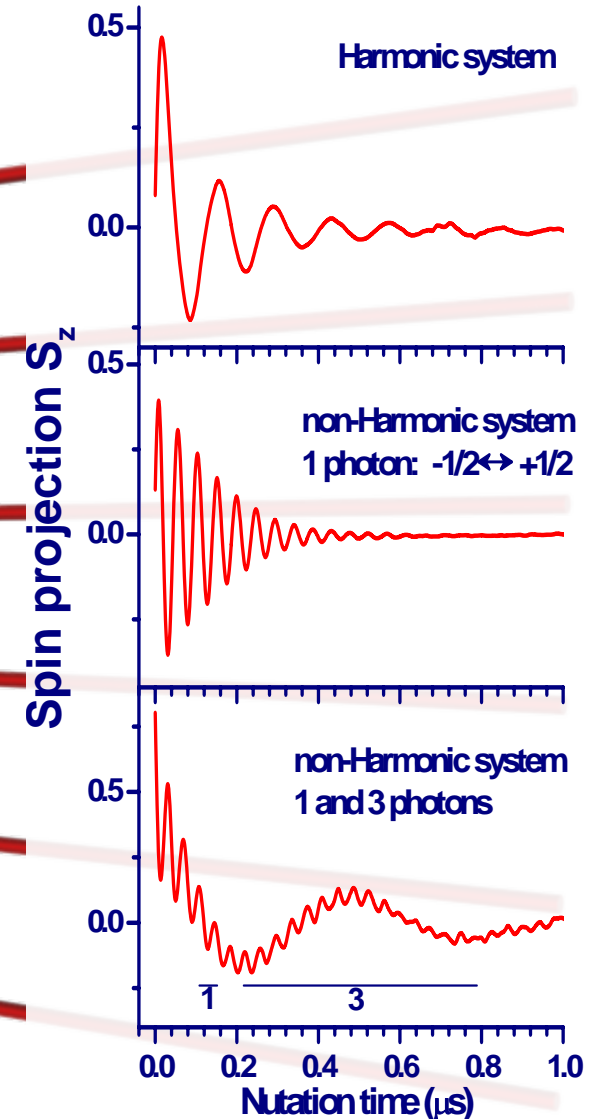
Multiphoton Coherent Manipulation in Large-Spin Qubits

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Phys. Rev. Lett. **102**, 050501 (2009)

The spin 5/2 of a Mn^{2+} ion in a non-magnetic matrix of MgO allows studying quantum phenomena at the interface between the **quantum** and **classical** world. We tune *in-situ* the spin level spacing, between a (pseudo-) harmonic configuration and non-harmonic one, and coherently manipulate the spin states between various levels. For this, we implemented a method using **multi-photon Rabi oscillations**.

Such multi-state systems are proposed for quantum algorithms in either size-limited or scalable schemes. We suggest ways of **manipulating, reading** and **resetting** spin quantum states which can be applied to encode a qubit across several quantum levels.



Sponsors:

NSF-DMR (0654118, 0645408, 0506946, 0701462), DARPA (HR0011-07-1-0031), Sloan Foundation, NHMFL (UCGP-5059)